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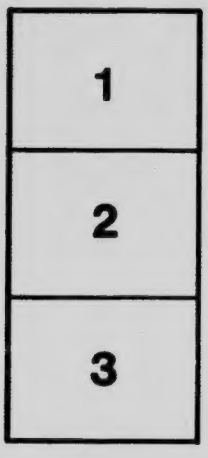

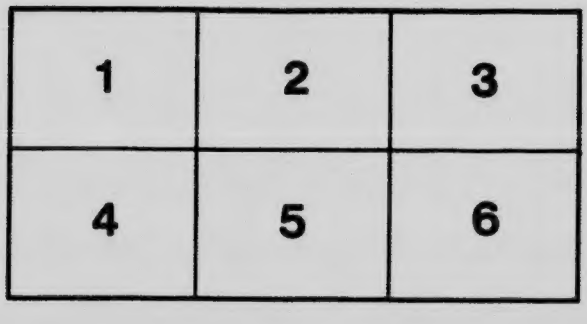

DEPARTMENT OF AGRICULTURE
DAIRY AND COLD STORAGE COMMISSIONER'S BRANCH,
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METHODS OF HANDLING BASKET FRUITS

BY
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AND
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LETTER OF TRANSMITTAL.

To the Honourable
The Minister of Agriculture.

SIR,—I beg to submit for your approval some notes on the handling of basket fruits which have been prepared by Edwin Smith and J. M. Creelman from data obtained in the operation of the Grimsby Precooling and Experimental Fruit Storage Warehouse.

A large part of the cost of precooling fruits is incurred in the handling in and out of the warehouse; therefore, any method which tends to reduce this cost is important information for fruit growers.

I have the honour to recommend that these notes be published as Bulletin No. 52 of the Dairy and Cold Storage Series.

I have the honour to be, sir,

Your obedient servant,

J. A. RUDDICK,
Dairy and Cold Storage Commissioner.

OTTAWA, ONT., [illegible] 1917.

METHODS OF HANDLING BASKET FRUITS.

The climax basket is used largely throughout the fruit regions of the northeastern part of the continent in marketing summer or tender fruits. In Canada the 6-quart climax basket is 4½ inches deep, 15¾ by 7 inches at the top, and 13½ by 5¾ inches at the bottom, holds from 6 to 10 pounds of fruit, and is used largely for distant shipments of cherries, gooseberries, currants, plums, pears, peaches, and grapes. The 11-quart climax basket is 5¾ inches deep, 18¾ by 8 inches at the top, and 16¾ by 6¾ inches at the bottom, contains from 15 to 20 pounds of fruit, and is used with shipments of cherries, plums, peaches, tomatoes, vegetables, pears, and apples. Larger baskets, 15-quart and 16-quart in size, are used for cantaloupes; smaller baskets, 4-quart in size, are sometimes used with plums and grapes.

The climax baskets have many advantages as well as disadvantages. The former may be summed up in cheapness, simplicity in packing, reduction in handling between picking and packing, exhibition of fruit when offered for sale and ease with which customers may carry away a purchase. Their disadvantages include fragility, with severe breakage, pilferage and loss in shipment, difficulty in making attractive packs, poor protection to fruit contained with resulting bruises and injuries, difficulty of handling in large quantities and difficulty in satisfactory carloading.

When the Dominion Precooling and Experimental Fruit Storage Warehouse at Grimsby was put in operation in 1914, it was necessary to meet the last two problems, since the fruit to be received for shipment in the Niagara district is packed in baskets, and the old practice of carrying baskets from the growers' drays and stacking had to be supplanted by improved methods. The fact that in precooling, the fruit packages must be held up a space from the floor to give the cold air a chance to circulate throughout the fruit, and the task of receiving and shipping several thousand baskets daily, keeping different shippers' stocks of the various kinds and grades of fruit separate, made this need of improvement imperative. The purpose of this circular is to show how these conditions were met and to describe the solution of the difficulties.

Four Swivel Steel Trucks.

By using several types of four-wheeled slatted-platform trucks, their merits were combined in a composite which produced the platform truck with four swivel castors shown in our illustrations and the diagrams 1 and 2 on page 9. To accommodate both 11-quart and 6-quart baskets and various other fruit packages efficiently, and still retain a size convenient for passing through corridors and doors, a length of 5 feet 6 inches and a width of 3 feet 2 inches was adopted as standard for the platform proper. The end racks extend out about 1 inch from the end of the platform, are made from 1-inch gas pipe, and are 2 feet, 1½ inches higher than the surface of the platform. They are securely bracketed to the body of the truck, so as to give sufficient strength for handling loads.

The platform is made from eight birch strips 2¼ inches wide by ¾ inch thick, and two outside strips 4½ inches wide by ¾ inch thick, spaced 1½ inches apart, and supported on a birch frame made from 1½ by 5-inch material, having four cross bed-pieces of the same material.

The importance of having four swivel wheels, or castors, has been made apparent at all times, since in handling from one to six carloads of fruit per day, it is neces-

sary to leave the fruit on the trucks while cooling, filling the precooling room entirely with loaded trucks, and removing them to the car as soon as cooled. Were it not for the swivels on each corner, it would be impossible to fill the rooms without great loss in space, because they allow trucks to be placed in corners, shoved sidewise in filling spaces and turned about sharp curves in narrow alleys. Great difficulty would be experienced in turning into the rooms from the corridors were it not for swivels at both ends; although the latter difficulty might be overcome in the centre-wheeled type of truck were it adaptable to close placing in the rooms. The castors are of very heavy construction with steel pins in the swivels. This is important on account of the heavy loads carried causing a strain on these parts when running over sills, against obstacles, or into the refrigerator cars. There has been the objection raised that this type of truck is more difficult to handle than one with other kind of wheels. This is undoubtedly true, but three years' experience at Grimsby has shown that with plenty of lubrication two men can roll them on the level and that the advantage of the swivel wheels more than offsets this difficulty.

In loading these trucks ordinarily from 160 to 180 6-quart baskets are used for a load and from 84 to 100 11-quart baskets, aggregating a weight of from 1,000 to 1,600 pounds per truck. On account of different kinds of fruits and different times of receiving not all of the trucks are full when placed in the rooms, so that it requires from fourteen to seventen trucks to handle a carload. The rooms at the Grimsby plant will hold seventeen trucks each, so that no difficulty is experienced in placing a carload of fruit in each room. In cars having many small lots of different fruits, it is necessary to place different kinds on a single truck. In this case, the card placed on the top of the truck states amounts and kinds for checking and tallying purposes.

There is always some necessity to handle leno or heaped baskets of fruit. This is accomplished by building racks to accommodate these packages, and by using the Wolverton or Hunter crates.

The trucks cost $15.85 each and can be manufactured locally.

The "Grimsby" Truck.

Owing to the employment of boys in handling baskets during the fruit season, a system of trucking was demanded that would require less muscle in handling. In working out such a system, it was sought to adapt the western clamp-box truck to the use of baskets by providing a raised platform or stand for the clamps to grasp, which would at the same time serve the purpose of raising the fruit packages off the floor to allow the cold air for precooling to pass up through the perforated floor and circulate freely through the fruit packages. In adopting the truck, it was found advisable to provide it with an extended tongue, as shown in the illustration on page 13, which catches underneath the stands on which are piled the baskets or boxes, lifts the stack clear from the floor for trucking, releases it, and slides out when the proper location has been reached. In this manner, the stacks of baskets are carried to the precooling rooms for cooling, after which they are taken directly into the car—the fruit is unloaded from the stands, and they are transported back to the receiving platform.

The trucks used in the Grimsby warehouse during the past season proved very useful and satisfactory. The name applied to this truck by the warehouse staff was that of the "Grimsby" truck. On busy days at the warehouse, the demand for the "Grimsby" truck is very heavy. While the large trucks are used first, there are days when all the fruit received cannot be accommodated by the large trucks and many hundred baskets are stacked on stands.

The "Grimsby" stands find their best place in receiving and storing small lots of heterogeneous kinds and grades of fruits, where it is not advisable that they should be piled together. This method is convenient in finishing off, when loading cars, since the space left in the centre of the car for bracing purposes is not enough to allow the large trucks to enter, whereas there is ample room to shove in the "Grimsby" stands. More fruit can be placed in a precooling room on "Grimsby" stands than on the larger trucks. However, in adopting a system of trucking for a new warehouse, probably the initial cost of equipment would stand more in this system's favour than any other thing. The cost of equipment for handling a carload of fruit with "Grimsby" trucks would not exceed $25, whereas with the large four-wheel trucks the investment would amount to $270. About the same amount of labour is required to handle fruit on these trucks as on the large ones, since to load a car rapidly it is necessary to have two truckers moving fruit to the car. However, it is to be noted that it is lighter work to handle the "Grimsby" trucks, and it is possible for one man to receive at the door and truck the fruit into the rooms without assistance.

The Method Employed.

It is necessary to advocate the general use of these trucks with caution since they are not a success unless the baskets used are very strong. As it is necessary to stack baskets by two's or three's on the stands, there is a tendency for the whole lot to start careening, whereupon the bottom baskets sag, spring or bulge, allowing the careening to increase, much to the injury of the fruit in the bottom baskets, if not to the whole pile in case of a toppling over of the stack. This difficulty is not met with in using the large trucks since piles have such a large base that the baskets bind or tie each other in place like bricks in a wall, giving no chance for the sagging or careening to start. To meet this difficulty, it is advisable to use only strong baskets. In making the piles, place the baskets closely together so that the weight of the baskets covers fully the edges of the baskets underneath; make sure the lids of the baskets are fastened at the sides to prevent bulging; and in placing the stacks in the precooling room leave them close together so that there is no chance of their sagging over. In this connection, it is to be noted that the "Grimsby" is preferable to the clamp truck ordinarily used with boxes, since no room needs to be left between stacks or stands for the removal of the clamps of the trucks and it is possible to pile them more closely together. The "Grimsby" trucks are simple to build and may be constructed by any local blacksmith according to the drawings on page (diagram 3). The stands are made from three 1- by 4-inch boards mounted on 2- by 2-inch strips as raisers. These are made to accommodate a three-pile of 6-quart baskets or a two-pile of 11-quart baskets. The 6-quart baskets are customarily stacked ten high, making thirty baskets for each stand, while the 11-quart baskets are stacked eight high, making a load of sixteen baskets.

Notes on Car Loading of Basket Fruits.

In using either the large trucks or the "Grimsby" stands the fruit is not removed from the trucks or stands in the precooling rooms, and as soon as properly cooled, the trucks or stands are rolled into the refrigerator car and unloaded into position in the car.

In theory all baskets should run lengthwise of the car to give free spaces for the passage of cold air from the ice-bunkers to the centre of the car; baskets crossing the car shut off these currents. In practice, it is difficult to do this, on account of different sizes being loaded in the same car, and also due to injury inflicted on the fruit in so placing. To partially obviate the fault of having baskets running cross-

wise of the car raised floor racks are used, slatted to accommodate the different sized baskets, as shown in diagram 4 on page 11. These allow a current of cold air to pass freely from the ice-bunkers along the floor to the centre of the load.

In loading a car of basket fruits, it is first necessary to know the number of baskets to be loaded. Ordinarily between 2,400 and 2,500 6-quart baskets, or 1,200 11-quart baskets, are required to make the minimum carload weight, 20,000 pounds. Baskets are placed along the end of the car and down one side, as far to the centre as the load can be made and allow room for centre bracing. The height of the load is then computed. In case the load is to be made partially of 6-quart baskets and 11-quart baskets, it will be necessary to "square up" the load of one type of baskets, placing them all in one block. Loading is then started from the bunkers and the tiers carried out along the side of the car to the full height of the load. For rapid

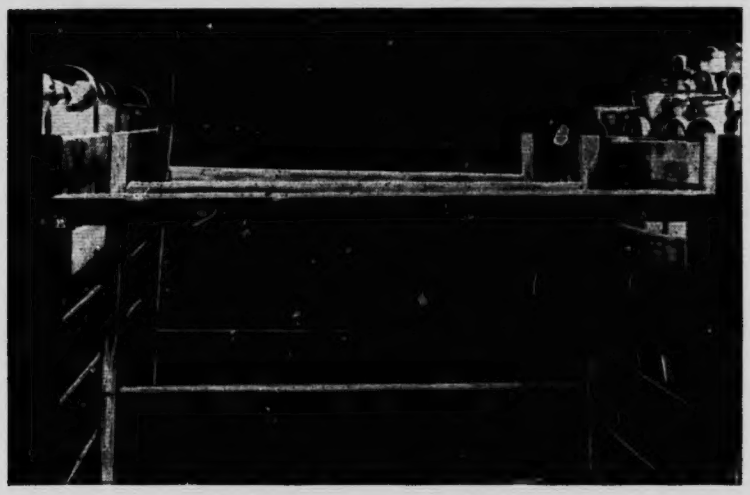
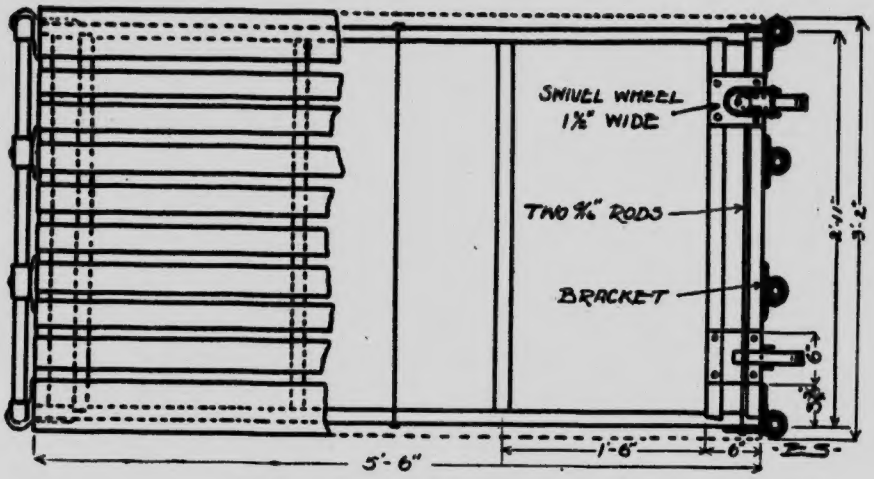


Fig. 1. Showing method of bracing a car loaded with Climax Baskets.

loading, operations may start at both ends of the car at once. It is necessary that the baskets be kept pressed firmly against the side of the car, and, as the load progresses, every basket should be put in place squarely and firmly so as to keep the baskets touching end to end and the alignment perfect. This is necessary to get a rigid load and to have the load finish satisfactorily both towards the side of the car and at the end, where a bulkhead is to be placed squarely across the car.

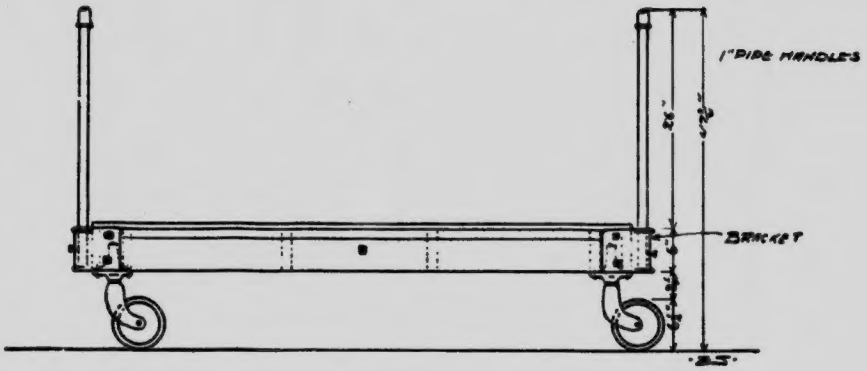
In finishing off the last two tiers, an alley will be formed in which it is difficult to work unless the baskets are squared up three-piles or four-piles (meaning that the piles are built up squarely on a base of three or four baskets). It sometimes happens that, due to an odd-sized car or odd-sized baskets, the alley will be too wide so as to make a "loose" load. This can be determined before the load has been made, when the baskets are placed across the end. In such a case, it is advisable to place several baskets crosswise throughout the car to tie the load.

Basket loading does not require as heavy bracing in the centre of the car as boxes, since the handles are effective in tying the load. Six 2- by 4-inch braces are sufficient. They need to be squeezed into place with a sledge-hammer securing the braces with blocks and spikes. The gates should not be farther apart than is convenient for entering the braces—about two feet is sufficient.



FRAME AND PLATFORM

Diagram 1. Showing Truck with 4 Swivel Wheels.



ELEVATION

Diagram 2. Showing Truck with four Swivel Wheels.

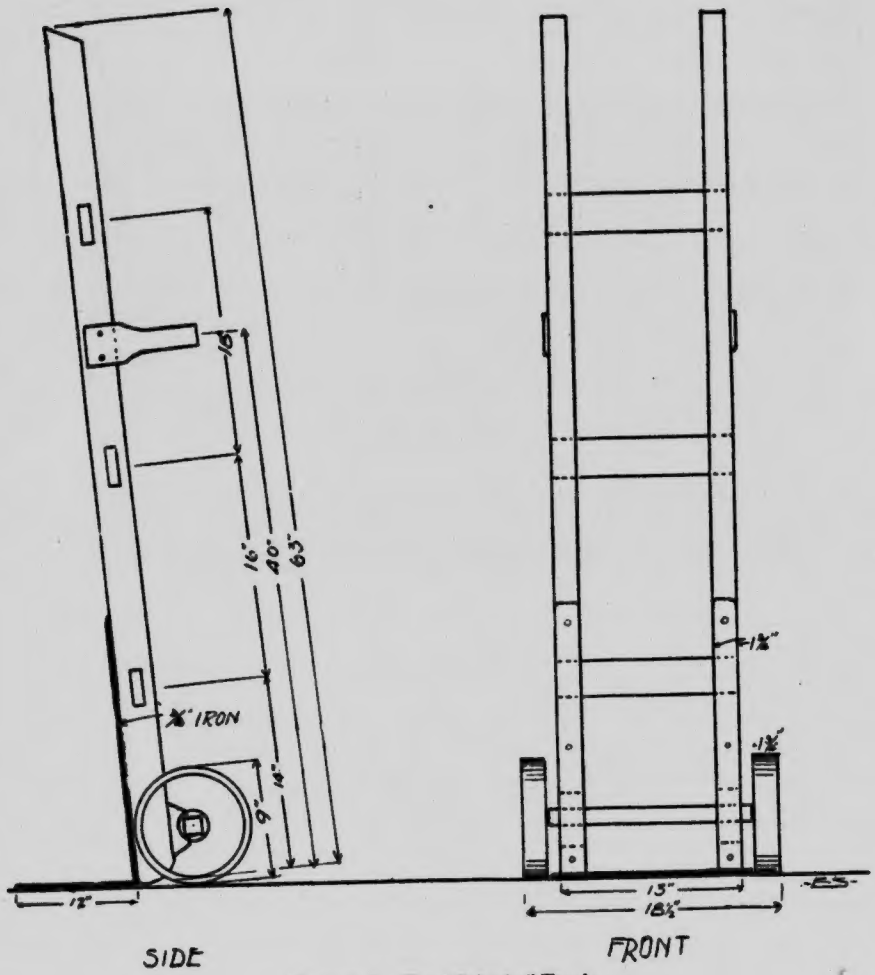


Diagram 3. The "Grimsby" Truck.

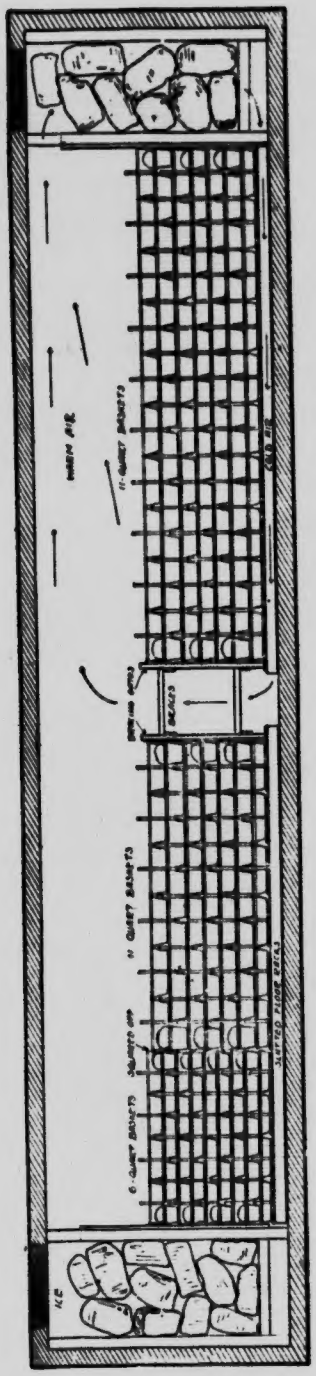


Diagram 4. Showing Method of Loading a Car with Climax Baskets.

Fig. 2. Receiving Fruit for precooling at Grimsby.

Fig. 3. Swivel-wheeled Trucks loaded with 100 11-quart baskets.

Fig. 4. The "Grimsby" Truck and stand with 11-quart Baskets.

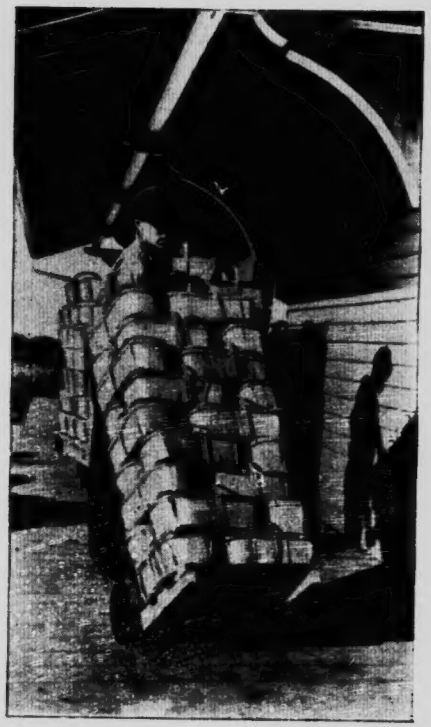


Fig. 5. The "Grimsby" Truck handling 6-quart baskets.

Fig. 6. The "Grimsby" Truck handling Crates.